

# Replacement names and nomenclatural comments for problematic species-group names in Europe's Neogene freshwater Gastropoda. Part 2

Thomas A. Neubauer<sup>1</sup>, Mathias Harzhauser<sup>1</sup>, Andreas Kroh<sup>1</sup>,  
Elisavet Georgopoulou<sup>1</sup>, Oleg Mandic<sup>1</sup>

<sup>1</sup> Geological-Paleontological Department, Natural History Museum Vienna, 1010 Vienna, Austria

Corresponding author: Thomas A. Neubauer (thomas.neubauer@nhm-wien.ac.at)

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## Abstract

In the course of a new database project on Miocene to Recent freshwater gastropods of Europe, a great many of primary and secondary homonyms were revealed. Such nomenclatural issues need clarification in order to avoid misunderstandings and wrong statements about geographical distributions and temporal ranges. The following 16 new names are introduced to replace existing homonyms: *Theodoxus militaris jurisicpolsakae* nom. n., *Viviparus steanovici* nom. n., *Melanopsis haueri ripanensis* nom. n., *Melanopsis wolfgangfischeri* nom. n., *Micromelania ramakanensis* nom. n., *Pseudamnicola welterschultesi* nom. n., *Muellerpalia haszprunari* nom. n., *Muellerpalia pseudovalvatoides* nom. n., *Lithoglyphus gozhiki* nom. n., *Valvata heidemariae willmanni* nom. n., *Radix macaleti* nom. n., *Gyraulus okrugljakensis* nom. n., *Gyraulus rasseri* nom. n., *Gyraulus vrapceanus* nom. n., *Planorbarius halavatsi* nom. n., and *Segmentina mosbachensis* nom. n. Additionally, six cases of homonyms are discussed that are not replaced by new names, because they are considered junior synonyms.

## Keywords

Homonyms, synonyms, nomina nova, fossil freshwater gastropods

## Introduction

The latest estimate of living freshwater gastropod species involves about 4,000 described and valid species world-wide (Strong et al. 2008). Including the names for fossil gastropods, which were not considered in that study, certainly doubles if not multiplies the estimation on introduced and formally available species-group names. The practice to use common, descriptive terms (e.g., "*carinatus*", "*rugosus*" or "*elongatus*") as species-group names resulted in a great number of primary and secondary homonyms.

As to the fossil part, there are several publications dealing explicitly with this problem. In four subsequent works Pallary (1916, 1920, 1925, 1926) compiled the existing names of fossil and Recent melanopsid species described up to that time and introduced many new names for numerous homonyms. Likewise, Wenz came across a great number of such homonyms for terrestrial and freshwater gastropods when gathering literature for his *Fossilium Catalogus* (Wenz 1923–1930). In a series of eleven short nomenclatural works, he disposed of such errors by introducing replacement names (Wenz 1919a, 1919b, 1919c, 1922, 1923a, 1924, 1925, 1928b, 1928sc, 1929b, 1930).

The newly established FreshGEN (Freshwater Gastropods of the European Neogene) database project, an initiative aimed at a pan-European reconstruction of the Neogene and Quaternary biodiversity of lacustrine gastropods, successively uncovered nomenclatural mistakes that have not yet been detected and/or revised. Following the first part of the resulting nomenclatural amendment (Neubauer et al. 2014), the current paper settles newly disclosed conflicts by introducing replacement names where required. This contribution is certainly just a small part in a greater picture, but is an essential basis for any future studies. In almost all cases this regards primary homonyms; only for two secondary homonyms replacement names are established, where the generic attribution is considered reliable. Only those primary homonyms are replaced that are today considered accepted taxa, ergo not disused junior synonyms. Such cases as well as two apparent homonyms are additionally discussed.

The systematics follows Bouchet et al. (2005), Jörger et al. (2010), Criscione and Ponder (2013), and the WoRMS database. Where available, information about type locality, age of the deposits, and type material is taken from the original publications. In cases where this information is lacking, insufficient or wrong, other sources were consulted and are specified accordingly.

## Homonyms

**Class Gastropoda Cuvier, 1795**

**Subclass Neritimorpha Golikov & Starobogatov, 1975**

**Order Cycloneritimorpha Fryda, 1998**

**Superfamily Neritoidea Rafinesque, 1815**

**Family Neritidae Rafinesque, 1815**

**Subfamily Neritinae Poey, 1852**

**Genus *Theodoxus* Montfort, 1810**

**Type species.** *Theodoxus lutetianus* Montfort, 1810 [currently considered as a synonym of *Theodoxus fluviatilis* (Linnaeus, 1758)]. Recent, Europe. Type by original designation (Welter-Schultes 2012, p. 26).

***Theodoxus militaris jurisicpolsakae* nom. n.**

*Theodoxus (Theodoxus) militaris oblongus* Jurišić-Polšak, 1979: 28, pl. 10, fig. 2 [non *Neritina leobersdorffensis oblonga* Handmann, 1887].

**Etymology.** In honor of Zlata Jurišić-Polšak (Croatian Natural History Museum), who contributed to our knowledge of Neogene Neritidae.

**Type locality.** Malino, Croatia.

**Age.** Late Pliocene to Early Pleistocene ("Paludina Beds").

**Syntypes.** Croatian Natural History Museum, coll. no. 9454.

**Discussion.** Handmann (1887, p. 9) described and figured *Neritina leobersdorffensis* var. *oblonga* from the Late Miocene of the Vienna Basin and made it thus available as species-group name (published before 1961, see ICBN 1999, Articles 45 and 57.1). The subspecific status was maintained by Papp (1953, p. 99), who recombined the species with *Theodoxus*. Although Jurišić-Polšak (1979) mentioned that species and cited both works in her study about Miocene and Pliocene neritids from Croatia, she established the name *oblongus* for a different species-group taxon in *Theodoxus*. Thereby she referred to a determination by Spiridion Brusina, who had established the name "*Neritina militaris* var. *oblonga*" for material in the collection but never published it. Jurišić-Polšak accepted this "*in schedis*"-determination and formally described the subspecies, obviously unaware of the fact that this would create a secondary homonym. It can be separated from the nominal species by the more elevated spire and the fewer axial ribs.

**Subclass Caenogastropoda Cox, 1960****Order unassigned****Superfamily Viviparoidea Gray, 1847****Family Viviparidae Gray, 1847****Subfamily Viviparinae Gray, 1847****Genus *Viviparus* Montfort, 1810**

**Type species.** *Viviparus fluviorum* Montfort, 1810 [currently considered as a synonym of *Viviparus viviparus* (Linnaeus, 1758)]. Recent, Northern Eurasia, Europe, Anatolia and Northern America. Type by original designation (Welter-Schultes 2012, p. 31).

***Viviparus stevanovici* nom. n.**

*Viviparus elongatus* Stevanović, 1978: 325, pl. 5, figs 1–3 [non *Paludina elongata* d'Orbigny, 1837].

*Viviparus elongatus* Stevanović; Stevanović 1990: 501, pl. 14, figs 9–10 [non d'Orbigny 1837].

**Etymology.** In honor of Petar M. Stevanović (Belgrade), who greatly contributed to our knowledge of the mollusc fauna and biostratigraphy of the Late Miocene of Serbia.

**Type locality.** Kostolac opencast mine, Serbia.

**Age.** Late Miocene to Early Pliocene (Late Pannonian, Late Portaferrian).

**Holotype.** Natural History Museum, Belgrade, coll. no. 5683.

**Discussion.** Since *Paludina* Féruccac, 1812 is a junior objective synonym of *Viviparus* Montfort, 1810 (ICZN 1959, Op. 573), this species is a primary homonym of the Late Eocene *Viviparus elongatus* (d'Orbigny, 1837) from the Paris Basin and needs a nomen novum. The Eocene species has been synonymized with the co-occurring *Hydrobia pyramidalis* (Féruccac, 1814) by Sandberger (1873, p. 266), a decision followed by Wenz (1926, p. 1968).

**Order unassigned**

**Superfamily Cerithioidea Fleming, 1822**

**Family Melanopsidae Adams & Adams, 1854**

**Subfamily Melanopsinae Adams & Adams, 1854**

**Genus *Melanopsis* Féruccac, 1807**

**Type species.** *Melania costata* Olivier, 1804. Recent, Europe. Subsequent designation by Gray (1847, p. 153).

***Melanopsis haueri ripanjensis* nom. n.**

*Melanopsis austriaca serbica* Brusina, 1902: pl. 6, figs 73–74 [non *Melanopsis serbica* Brusina, 1893].

*Melanopsis haueri serbica* Brusina; Wenz 1929a: 2743 [non Brusina 1893].

**Etymology.** Named after the type locality.

**Type locality.** Ripanj, Serbia.

**Age.** Late Miocene (Early-Middle Pannonian; Pavlović 1927).

**Syntypes.** Croatian Natural History Museum, Zagreb, coll. no. 2530-176/1-2 (Milan et al. 1974, p. 86).

**Discussion.** Obviously unaware of the fact that also subspecific or variety names can constitute homonyms, Brusina (1902) introduced *M. austriaca serbica* from the Early Pannonian of Serbia, although this name was already preoccupied by another species described by himself, *M. serbica* Brusina, 1893 (p. 50). The latter species was also described from the Early Pannonian of Serbia (locality Begaljica, c. 15 km E Ripanj), but clearly represents a different taxon as evident from Brusina's descriptions and illustrations. Here we follow the taxonomic decision of Wenz (1929a), who synonymized *M. austriaca* Handmann, 1882 with *M. haueri* Handmann, 1882 (both from the Kottingbrunn, Austria) and consequently ranked the here discussed taxon as subspecies of *M. haueri*. *Melanopsis haueri serbica* can be distinguished from *M. haueri haueri* in its distinctly stronger spruce-like outline.

### *Melanopsis wolfgangfischeri* nom. n.

[*Mel. Martiniana*] Var. *rugosa* Handmann, 1887: 26, pl. 5, figs 5–7 [non *Melanopsis rugosa* Matheron, 1842].

*Melanopsis rugosa* Handmann; Papp 1953: 136, pl. 10, figs 13–16 [non Matheron 1842].

*Melanopsis rugosa* Handmann 1887; Fischer 1996: 23 (cum syn.) [non Matheron 1842].

**Etymology.** In honor of Wolfgang Fischer (Vienna), who greatly contributed to nomenclature and taxonomy of fossil and Recent melanopsids.

**Type locality.** Wittmannsdorf near Leobersdorf, Austria (Fischer 1996).

**Age.** Late Miocene (Early Pannonian, Slavonian; Papp 1951).

**Type material.** Geological Survey Austria, Vienna, no number indicated (Fischer 1996).

**Discussion.** This taxon is a primary homonym of *Melanopsis rugosa* Matheron, 1842 (p. 293, pl. 37, fig. 11), a fossil species from SE France. *Melanopsis rugosa* Handmann, 1887 is a member of the complexly evolving *M. impressa*-species lineage in the Late Miocene Lake Pannon (Geary 1990, Geary et al. 2012, Neubauer et al. 2013a). The morphological variability in this group resulted in the description of many names, most of which are today synonymized. While Wenz (1929a, p. 2719) regarded *rugosa* Handmann as synonym of *M. fossilis* (which is the accepted name of "*M. martiniana*"), Papp (1953), Lueger (1980) and Fischer (1996) treated it as separate species. As implied by Neubauer et al. (2013a) the validity in a biological sense of this and other species-group taxa is doubtful. Nevertheless, since many authors clearly referred to it as a separable unit, a replacement name is inevitable.

Additionally, there exists another primary homonym of *M. rugosa*, i.e. *M. lanzaeana rugosa* Brusina, 1897 from the Middle Miocene deposits of the Sinj Basin. It was synonymized with *M. lanzaeana* by Neubauer et al. (2011, p. 205), who treated it as a mere morphotype and already mentioned the problem of homonymy. We therefore avoid introducing another name for this Croatian taxon, which is not used anymore.

**Order Littorinimorpha Golikov & Starobogatov, 1975****Superfamily Truncatelloidea Gray, 1840****Family Hydrobiidae Stimpson, 1865****Subfamily Micromelaniinae Dybowski and Grochmalicki, 1914**

**Note.** The taxonomic status of the Micromelaniinae is currently under discussion. The rank as subfamily follows Wenz (1926, p. 2126; erroneously written as "Micromelaniinae"). See also Kabat and Hershler (1993) and Wilke et al. (2007). The classification of the Hydrobiidae within the Truncatelloidea follows the latest molecular systematics established by Criscione and Ponder (2013).

**Genus *Micromelania* Brusina, 1874**

**Type species.** *Micromelania cerithiopsis* Brusina, 1874. Late Miocene, Croatia. Subsequent designation by Brusina (1892, p. 164).

***Micromelania ramakanensis* nom. n.**

*Micromelania* sp. Brusina: pl. 7, figs 59–60.

*Micromelania Brusinai* Pavlović, 1927: 96 [non *Micromelania brusinai* Andrusov, 1905].

**Etymology.** Named after the type locality.

**Type locality.** Ripanj, Ramača hamlet (also read Ramaća), Serbia.

**Age.** Late Miocene (Early-Middle Pannonian; Pavlović 1927).

**Syntypes.** Brusina (1902, pl. 7, figs 59–60); Croatian Natural History Museum, Zagreb, no number indicated (Milan et al. 1974).

**Discussion.** This is a classic case of a primary homonym requiring a replacement name according to ICBN (1999, Article 57.2). *Micromelania brusinai* Andrusov, 1905 from the Maeotian of the Crimean Peninsula, Ukraine, is currently considered synonymous with *M. gorianovici* Andrusov, 1897 (Davitashvili 1931, p. 27). The latter name was introduced as nomen novum by Andrusov (1897, p. 431) for the primary homonym *Micromelania striata* Andrusov, 1890 non Gorjanović-Kramberger 1890.

**Subfamily Pseudamnicolinae Radoman, 1977****Genus *Pseudamnicola* Paulucci, 1878**

**Type species.** *Paludina macrostoma* Küster, 1853. Recent, Europe. Subsequent designation by Wagner (1928, p. 276; see also Kabat and Hershler 1993, p. 45).

***Pseudamnicola welterschultesi* nom. n.**

*Valvata minima* Fuchs, 1877: 14, pl. 1, figs 25–27 [non *Valvata minima* Hislop, 1859].  
*Valvata (Cincinnna) minima* Fuchs; Wenz 1928a: 2439 (cum syn.) [non Hislop 1859].  
*Pseudamnicola minima* (Fuchs, 1877); Willmann 1981: 212, textfig. 74 [non Hislop 1859].

**Etymology.** In honor of Francisco W. Welter-Schultes (University of Göttingen), a great expert for the living non-marine mollusks of Europe.

**Type locality.** Megara, Greece.

**Age.** Pliocene (Papp and Steininger 1979).

**Lectotype and paralectotypes.** Natural History Museum Vienna, coll. no. 1878/0020/0023 (designation by Willmann 1981, p. 212).

**Discussion.** This species is a primary homonym of *Valvata minima* Hislop, 1859 (p. 170, pl. 5, fig. 13) from the Tertiary of East India (see also Haszprunar 2014, p. 69) and needs a replacement name. Based on general shape and the lack of striae on the protoconch typical of *Valvata*, Willmann (1981) combined this species with *Pseudamnicola*, what is followed herein.

Jekelius (1944), Stevanović (1951) and Bartha (1955) and several other authors also documented this taxon from various localities of the early Late Miocene of Lake Pannon. Given the stratigraphical and biogeographical gaps, these records probably represent different species.

**Subfamily unknown****Genus *Muellerpalia* Bandel, 2010**

**Type species.** *Planorbis bicincta* Fuchs, 1870 in Fuchs 1870b. Recent, Europe. Type by original designation (Bandel 2010, p. 103).

***Muellerpalia haszprunari* nom. n.**

*Valvata simplex* Fuchs, 1870 in Fuchs 1870b: 535, pl. 21, figs 4–6 [non *Valvata tricarinata* var. *simplex* Gould, 1841].

*Valvata (Valvata) simplex simplex* Fuchs; Wenz 1928a: 2474 (cum syn.) [non Gould 1841].

*Valvata simplex* Fuchs; Strausz 1942: 80 [non Gould 1841].

*Hauffenia simplex* (Fuchs); Schlickum 1978: 247, pl. 18, fig. 3 [non Gould 1841].

*Hauffenia simplex* (Fuchs 1870); Harzhauser and Binder 2004: 9 [non Gould 1841].

**Etymology.** In honor of Gerhard Haszprunar (Bavarian State Collection of Zoology Munich and Ludwig Maximilians University Munich), who summarized all existing names of living and fossil valvatids in a comprehensive nomenclator (Haszprunar 2014).

**Type locality.** Tihany at Lake Balaton, Veszprém, Hungary.

**Age.** Late Miocene (Late Pannonian, Transdanubian sensu Sacchi and Horváth 2002; Sztanó et al. 2013).

**Type material.** According to the inventory books of the Natural History Museum Vienna the material should be stored there, but despite great effort it could not be located.

**Discussion.** This species is a primary homonym of the extant taxon *Valvata tricarinata* var. *simplex* Gould, 1841 (p. 226) from Massachusetts, USA. The American taxon was elevated to species level by Fluck (1932). As the European species was combined with various genera since its first description and several subspecies have been described, a summary of its history is given below.

Already Schlickum (1978) considered *V. simplex* Fuchs, 1870 to belong to the Hydrobiidae and placed it in the genus *Hauffenia*, based on similarities of morphology and size. Recently, Bandel (2010) introduced the new genus *Muellerpalia* for *V. bicincta* Fuchs, 1870 in Fuchs (1870b), *V. carinata* Fuchs, 1870 in Fuchs (1870b), *Planorbis varians* Fuchs, 1870 in Fuchs (1870a), *V. simplex* Fuchs, 1870 in Fuchs (1870b), and two new species (see discussion in Neubauer et al. 2014 for the rather confusing systematics applied in Bandel 2010). We follow Bandel and place the species within *Muellerpalia*.

The following subspecies have been introduced or ranked within *V. simplex* Fuchs, 1870:

- 1) *Valvata bicincta* Fuchs, 1870 [erroneously "bacinata" on p. 536; from captions and description there is no doubt about the correct name] from Tihany: It was considered a subspecies of *V. simplex* by Lörenthay (1906, p. 166), what was followed by Wenz (1928a, p. 2475) and Strausz (1942, p. 36). Bandel (2010, p. 103) treated it as separate species and combined it with the new genus *Muellerpalia*. Current status: *Muellerpalia bicincta*.
- 2) *Valvata carinata* Fuchs, 1870 (p. 536) from Tihany: It was considered as subspecies of *V. simplex* by Pană et al. (1981) and Pană (2003), but recombined with the new genus *Muellerpalia* by Bandel (2010, p. 104). It is, however, a primary homonym of *Valvata carinata* Sowerby, 1834 (replacement name is introduced below).
- 3) *Valvata simplex öcsensis* Soós, 1934 (p. 189) from Öcs: Schlickum (1978, p. 246) clearly separated this taxon from "*Hauffenia simplex*" and retained it in *Valvata*. Wenz and Edlauer (1942, p. 83) elevated it to species level, what was followed by Papp (1953, p. 109), and Harzhauser and Binder (2004, p. 10). In some of the mentioned publications the name was erroneously emended to "*oecensis*"; the correct emendation following ICZN rules is "*ocsensis*", since it is not derived from a German expression (ICZN 1999, Article 32.5.2.1). Current status: *Valvata ocsensis*.
- 4) *Valvata octonaria* Brusina, 1902 (pl. 13) from Tihany: It was also ranked as subspecies of *V. simplex* by Wenz (1928a, p. 2476). Since it was not referred to by Bandel (2010), its generic affiliation is uncertain. Current status (needs revision): *Muellerpalia haszprunari octonaria*.

- 5) *Valvata simplex polycincta* Lőrenthey, 1906 (p. 167) from Tihany: It was synonymized with *V. simplex octonaria* by Wenz (1928a, p. 2476). Current status: junior synonym of *Muellerpalia haszprunari octonaria*.
- 6) *Valvata simplex unicincta* Lőrenthey, 1906 (p. 165) from Tihany (Fehépart): The status of this taxon is doubtful. It was not mentioned by Wenz (1928a) or Bandel (2010). Given the similarity with *simplex* and *bicincta* stated by Lőrenthey, it might fall into the intraspecific variability of either of these species. Current status (needs revision): *Muellerpalia haszprunari unicincta*.

### *Muellerpalia pseudovalvatooides* nom. n.

*Valvata carinata* Fuchs, 1870 in Fuchs 1870b: 535, pl. 21, figs 10–12 [non *Valvata carinata* Sowerby, 1834].

*Valvata (Valvata) carinata* Fuchs; Wenz 1928a: 2465 [non Sowerby 1834].

*Valvata (Valvata) carinata* Fuchs, 1870; Gillet and Marinescu 1971: 47, pl. 19, figs 10–12 [non Sowerby 1834].

*Muellerpalia bicincta* (Fuchs, 1870); Bandel 2010: 103, pl. 7, figs 82–85 [non *Planorbis bicincta* Fuchs, 1870 in Fuchs 1870b].

**Etymology.** To denote that it is despite its similar shape not a member of the genus *Valvata*.

**Type locality.** Tihany at Lake Balaton, Veszprém, Hungary.

**Age.** Late Miocene (Late Pannonian, Transdanubian sensu Sacchi and Horváth 2002; Sztanó et al. 2013).

**Type material.** According to the inventory books of the Natural History Museum Vienna the material should be stored there, but despite great effort it could not be located.

**Discussion.** Up to now it has been overlooked by several authors, including ourselves (Neubauer et al. 2014), that this species is a primary homonym of *V. carinata* Sowerby, 1834 (see also Haszprunar 2014, p. 28). According to Bandel (2010, p. 104) this species should be classified within the new hydrobiid genus *Muellerpalia*, particularly because of its strongly different protoconch sculpture. This systematic concept is followed herein. For a more detailed discussion about the involved taxa and the species confusions in Bandel (2010) see Neubauer et al. (2014).

## Family Lithoglyphidae Tryon, 1866

### Genus *Lithoglyphus* Menke, 1830

**Type species.** *Paludina naticoides* Pfeiffer, 1828. Recent, Europe. Subsequent designation by Herrmannsen (1846, p. 612).

***Lithoglyphus gozhiki* nom. n.**

*Lithoglyphus maeoticus* Gozhik in Gozhik and Datsenko 2007: 88, pl. 81, figs 1–3 [non *Lithoglyphus maeoticus* Papaianopol, 2006].

**Etymology.** In honor of Piotr F. Gozhik (Kiev), who intensively studied the Neogene deposits of Ukraine and southern Russia.

**Type locality.** Nizhniy Dnepr (= lower Dnieper), Ukraine.

**Age.** Late Miocene (Early Maeotian, Oltenian).

**Holotype.** Institute of Geological Sciences, National Academy of Sciences of Ukraine, Kiev, coll. no. 2174.

**Discussion.** A classic case of a primary homonym. Probably as a result of prolonged publication times, Gozhik had no chance to become aware of this problem. However, the taxonomic status of *L. maeoticus* Papaianopol, 2006 from the Early Maeotian of the Dacian Basin is doubtful. It greatly resembles and might be a synonym of the Dacian species *L. acutus* Cobălcescu, 1883 (p. 145, pl. 14, fig. 10; see also Wenz 1942, p. 48, pl. 15, figs 195–198).

**Clade Heterobranchia****Informal Group Lower Heterobranchia****Superfamily Valvatoidea Gray, 1840****Family Valvatidae Gray, 1840**

**Note.** The here applied suprageneric systematics of *Valvata* follows Bouchet et al. (2005).

**Genus *Valvata* Müller, 1773**

**Type species.** *Valvata cristata* Müller, 1774. Recent, Europe. Type by subsequent monotypy (Müller 1774, p. 198; for details see Welter-Schultes 2012, p. 42).

***Valvata heidemariae willmanni* nom. n.**

*Valvata heidemariae bicarinata* Willmann, 1981: 158, textfigs 56D–F [non *Valvata bicarinata* Lea, 1841].

**Etymology.** In honor of Rainer Willmann (University of Kiel), who intensively studied the Plio-Pleistocene deposits and freshwater mollusks of Greece.

**Type locality.** Vokasia Valley 3 km SE of Kos City, Kos Island, Greece.

**Age.** Early Pleistocene (Middle Irakli Formation).

**Type material.** Geological-Paleontological Institute, University of Kiel, no number indicated; Willmann (1981, textfigs 56D–E).

**Discussion.** The species-group name *bicarinata* in combination with *Valvata* is preoccupied by the Recent species *Valvata bicarinata* Lea, 1841 from Pennsylvania, USA. The taxonomic separation from *V. heidemariae* Willmann, 1981 seems plausible, given the presence of a strong median keel on the upper whorl surface that is lacking in the nominal species.

**Clade Panpulmonata Jörger et al., 2010**

**Superorder Basommatophora Keferstein in Brönn, 1864**

**Order Hygrophila Féussac, 1822**

**Superfamily Lymnaeoidea Rafinesque, 1815**

**Family Lymnaeidae Rafinesque, 1815**

**Subfamily Lymnaeinae Rafinesque, 1815**

**Genus *Radix* Montfort, 1810**

**Type species.** *Helix Auricularia* Linnaeus, 1758. Recent, Europe. Type by original designation (for details see Welter-Schultes 2012, p. 51).

***Radix macaleti* nom. n.**

*Radix socialis* Macaleț, 2000: 252, pl. 2, figs 2–3 [non *Limnaea socialis* von Zieten, 1832].

**Etymology.** In honor of Rodica Macaleț (Bucharest), who studied the mollusk fauna of the Dacian Basin.

**Type locality.** Butuci near Sângeru, Prahova, Romania.

**Age.** Latest Miocene to earliest Pliocene (Pontian, Portaferrian-Bosphorian).

**Holotype.** Collection of the Geological Institute of Romania, coll. no. 19.546.

**Discussion.** This species is a secondary homonym of *Limnaea socialis* von Zieten, 1832, of which the presently accepted and widely used combination is *Radix socialis* (e.g., Wenz 1923b, Gall 1972, Kókay 2006). Macaleț (2000) omitted the "sp. nov." in the heading of the description, which he indicated for all other species newly introduced by him in this paper, but gave it in the figure captions and the text and he designated a holotype. *Radix macaleti* is one of several similar species newly introduced by Macaleț (2000). Although the Lymnaeinae of the Dacian Basin are not well represented in the older literature, several of these new taxa may actually represent synonyms of one another, given the extreme variability of this clade (see, e.g., Glöer 2002, Welter-Schultes 2012). A revision of the entire group in the Dacian Basin would be necessary to clarify this issue.

**Superfamily Planorboidea Rafinesque, 1815****Family Planorbidae Rafinesque, 1815****Subfamily Planorbinae Rafinesque, 1815****Genus *Gyraulus* Charpentier, 1837**

**Type species.** *Planorbis albus* Müller, 1774. Recent, Europe. Subsequent designation by Dall (1870, p. 351).

***Gyraulus okrugljakensis* nom. n.**

*Planorbis clathratus* Brusina, 1884: 171, pl. 30, fig. 29 [non *Planorbis (Helisoma) clathratus* Sandberger, 1880].

*Gyraulus (Gyraulus) clathratus* (Brusina); Wenz 1923c: 1545 [non Sandberger 1880].

**Etymology.** Named after the type locality.

**Type locality.** Okrugljak (today within the city limits of Zagreb), Croatia.

**Age.** Late Miocene (Late Pannonian, Portaferrian; Geary et al. 2010).

**Syntype.** Croatian Natural History Museum, Zagreb, coll. no. 2953-599/1 (Milan et al. 1974, p. 117).

**Discussion.** This species represents a primary homonym of *Planorbis (Helisoma) clathratus* Sandberger, 1880 from the Pleistocene of West Runton, Norfolk, United Kingdom. We follow Wenz (1923c), who placed Brusina's species within *Gyraulus*. The classification of the British species within *Helisoma* by Sandberger is rather doubtful. This North American genus was artificially introduced to Europe, wherefore an occurrence in the Pleistocene of the British Isles is unlikely. The morphology as depicted in Sandberger (1880) suggests an attribution to *Planorbarius*.

***Gyraulus rasseri* nom. n.**

*Planorbis discoideus* Pavlović, 1903: 181, pl. 5, figs 14–17 [non *Planorbis multiformis discoideus* Hilgendorf, 1867].

*Gyraulus (Gyraulus) discoideus* (Pavlović); Wenz 1923c: 1552 [non Hilgendorf 1867].

**Etymology.** In honor of Michael W. Rasser (State Museum of Natural History Stuttgart), who studied the *Gyraulus* species flock of Lake Steinheim.

**Type locality.** Orahovac (= Rahovec), Kosovo.

**Age.** Early Pliocene (Late Dacian to Early Romanian; Popović 1969).

**Holotype.** Natural History Museum, Belgrade, coll. no. 1176 (Milošević 1962, p. 27).

**Discussion.** The name *Planorbis discoideus* as established by Pavlović (1903) represents a primary homonym of *P. discoideus* Hilgendorf, 1867. The latter species is a member of the *Gyraulus* species flock in the Middle Miocene Lake Steinheim and is presently considered a junior synonym of *G. sulcatus* by Rasser (2013). From the rather character-poor shell it is impossible to reliably attribute Pavlović's species to *Planorbis* or *Gyraulus*. Here we follow the taxonomic decision of Wenz (1923c) to place it in *Gyraulus*.

### *Gyraulus vrapceanus* nom. n.

*Planorbis dubius* Gorjanović-Kramberger, 1890: 156, pl. 6, fig. 6 [non *Planorbis dubius* Hartmann, 1844].

*Gyraulus (Gyraulus) dubius* (Gorjanović-Kramberger); Wenz 1923c: 1552 [non Hartmann 1844].

**Etymology.** Named after the type locality.

**Type locality.** Vrapče (also read as Vrabče; today within the city limits of Zagreb), Croatia.

**Age.** Late Miocene (Early Pannonian, Slavonian).

**Syntype.** Croatian Natural History Museum, Zagreb, coll. no. 5195-360/2 (Milan et al. 1974, p. 119).

**Discussion.** The name *Planorbis dubius* was first used by Hartmann (1821, p. 254) for an extant species from Zurich region in Switzerland. The name is not available from this publication, since Hartmann did not give a description or indication (see also AnimalBase project 2005–2014). He first described and thus formally introduced it in Hartmann (1844, p. 111). Today its status is disputed. Glöer (2002, p. 253) ranked it as forma within *P. carinatus* Müller, 1774. Later, Glöer and Pešić (2010) stated that Hartmann's material contained two different taxa, i.e. *P. planorbis* and *P. carinatus*, making *P. dubius* a junior synonym of both. Finally, Kantor et al. (2010) listed it as accepted species in their catalogue of Russian continental mollusks. In summary, although the status of the extant species is doubtful, the name is available. This makes *Planorbis dubius* Gorjanović-Kramberger, 1890 a primary homonym of *Planorbis dubius* Hartmann, 1844. Here follow Wenz (1923c) and classify the replacement name within *Gyraulus*.

### Genus *Planorbarius* Duméril, 1806

**Type species.** *Helix cornea* Linnaeus, 1758. Recent, Europe. Subsequent monotypy by Froriep (1806).

### *Planorbarius halavatsi* nom. n.

*Planorbis grandis* Halaváts, 1903: 57, pl. 3, fig. 5 [non *Planorbis grandis* Dunker in Küster et al. 1850].

*Coretus grandis* (Halaváts); Wenz 1923c: 1472 [non Dunker in Küster et al. 1850].

*Planorbarius grandis* (Halaváts); Sauerzopf 1953: 50, pl. 1, figs 3–4 [non Dunker in Küster et al. 1850].

**Etymology.** In honor of Gyula von Halaváts (Budapest), who greatly contributed to our knowledge of Pannonian mollusks.

**Type locality.** Balatonfőkajár, Veszprém, Hungary.

**Age.** Late Miocene (Late Pannonian, ?Transdanubian sensu Sacchi and Horváth 2002).

**Holotype.** Hungarian Geological Institute, Budapest, coll. no. Pl. 121 (Boda 1964, p. 130).

**Discussion.** As both taxa were introduced within *Planorbis*, the species described by Halaváts is a primary homonym. Both are today unambiguously assigned to the genus *Planorbarius* (for the Pannonian species see, e.g., Sauerzopf 1953, Harzhauser and Tempfer 2004) and are in common usage, making the introduction of a replacement name indispensable. *Planorbis grandis* Dunker in Küster et al., 1850, an extant taxon from SE Europe, is currently ranked as subspecies of *P. corneus* (see Fauna Europaea project, De Jong 2013).

## Genus *Segmentina* Fleming, 1818

**Type species.** *Nautilus lacustris* Lightfoot, 1786 [currently considered as a synonym of *Segmentina nitida* (Müller, 1774)]. Recent, Europe. Type by monotypy (Welter-Schultes 2012, p. 70).

### *Segmentina mosbachensis* nom. n.

*Planorbis (Segmentina) micromphalus* Sandberger, 1875: 777, pl. 33, figs 19–19c [non *Planorbis micromphalus* Fuchs, 1870 in Fuchs 1870a].

*Planorbis nitidus* Müll. var. *micromphalus* Sandb.; Rzehak 1888: 308 [non Fuchs 1870a].

**Etymology.** Named after the type locality.

**Type locality.** Mosbach, Hessen, Germany.

**Age.** Early Pleistocene.

**Type material.** No storage or types indicated.

**Discussion.** The species name established by Sandberger is a primary homonym of *P. micromphalus* Fuchs, 1870, although he was apparently aware of the existence of this

name (compare Sandberger, 1875, p. 700). Also Lőrenthey (1902, p. 190) knew about the identical naming and discussed the differences between both taxa, but did not take appropriate steps to clarify this problem. Fuchs' species was first described from the Pannonian of Rădmăneşti in Romania and has been recombined with *Gyraulus* by Wenz (1923c, p. 1562; see also Harzhauser et al. 2002, p. 106).

## Discussions

In the following, we present six cases of primary and secondary homonyms that seem not to be in use anymore (e.g., are unambiguously considered junior synonyms). We were unable to find any recommendation in the Code regarding the necessity of replacement names for disused junior homonyms. Following the intent expressed in Article 23.9.5, which seems to discourage the proposal of unnecessary replacement names, we choose not to introduce new names for these cases. In addition, the statuses of two taxa apparently constituting homonyms are discussed.

**Superfamily Viviparoidea Gray, 1847**

**Family Viviparidae Gray, 1847**

**Genus *Viviparus* Montfort, 1810**

***Viviparus lomejkoi brevis* Popović, 1970 non (Tournouër, 1876)**

*Viviparus (V.) lomejkoi brevis* Popović, 1970: 318, figs 1: 7, 7a, 8 [non *Paludina (Vivipara) brusinai brevis* Tournouër 1876].

**Type locality.** Gjurakovc (= Đurakovac), Kosovo.

**Age.** Late Pliocene to Early Pleistocene (= "Levantin").

**Holotype.** Collection de l'Institut de recherches géologiques et géophysiques de Belgrade, no number indicated.

**Discussion.** Tournouër (1876) introduced *Paludina (Vivipara) Brusinai* var. *brevis* from the Early Pleistocene of Kos Island. Both genus-group names stated by Tournouër (1876) are, however, invalid. *Paludina* Féussac, 1812 is a junior objective synonym of *Viviparus* Montfort, 1810 (ICZN 1959, Op. 573) and *Vivipara* represents an incorrect subsequent spelling (Melville and Smith 1987, p. 185). The species-group name *brevis* in combination with *Viviparus* as introduced by Popović (1970) is therefore a homonym of *Viviparus brevis* (Tournouër, 1876). The latter taxon was elevated to species level by Willmann (1977); for thorough description, synonymy list, and discussion see Willmann (1981, p. 151).

Still we refrain from introducing a replacement name, because the taxonomic status of this subspecies is highly doubtful. It greatly resembles the nominal species *V. lomejkoi* Pavlović, 1932 from Crmljan and Orahovac (like the type locality Gjurakovc

in the Metohia Basin). The only difference is the stronger degree of whorl stepping, which is not documented by Pavlović's original description and illustrations. This is regarded to fall into intraspecific variability, why we suggest synonymizing *V. lomejkoi brevis* with *V. lomejkoi*. If, however, another author keeps both forms separate, a replacement name has to be introduced.

***Viviparus berbestiensis grandis* Lubenescu & Zazuleac, 1985 non Neumayr in Herbich & Neumayr, 1875**

*Viviparus berbestiensis grandis* Lubenescu & Zazuleac, 1985: 109, pl. 28, figs 15–17, pl. 29, fig. 12 [non *Vivipara grandis* Neumayr in Herbich and Neumayr 1875].

*Viviparus cucestiensis grandis* Lubenescu; Papaianopol and Marinescu 1995, pl. 44, fig. 5 [non Neumayr in Herbich and Neumayr 1875].

**Type locality.** Puilor Valley, Buzău, Romania.

**Age.** Early Pliocene (Late Dacian, Parscovan).

**Holotype.** Institut de Géologie et Géophysique, Bucharest, coll. no. 17055.

**Discussion.** *Vivipara*, as given by Neumayr in Herbich and Neumayr (1875, p. 413) and many other authors of this time, is an incorrect subsequent spelling of *Viviparus* Montfort, 1810 (Melville and Smith 1987, p. 185). The species-group name *grandis* in combination with *Viviparus*, as introduced for a new species by Lubenescu and Zazuleac (1985), therefore is a primary homonym of *Viviparus grandis* (Neumayr in Herbich & Neumayr 1875) and would require a replacement name (see also Wenz 1928a, p. 2323). We refrain from introducing a nomen novum because of the highly doubtful taxonomic status of this subspecies. The only criterion for Lubenescu and Zazuleac (1985, p. 110) to separate this form from the nominal species was the additional whorl and thus bigger size (therefore the name *grandis*). Apart from that it completely corresponds to *V. berbestiensis* Lubenescu & Zazuleac, 1985. Consequently, we regard *V. berbestiensis grandis* as junior synonym of *V. berbestiensis*.

Papaianopol and Marinescu (1995) ranked *V. berbestiensis grandis* as subspecies of *V. cucestiensis* Lubenescu & Zazuleac, 1985, but without explanation and only in the figure captions. Here we follow the original authors to avoid additional confusion.

**Superfamily Cerithioidea Fleming, 1822**

**Family Melanopsidae Adams and Adams, 1854**

**Genus *Melanopsis* Férußac, 1807**

***Melanopsis pygmaea inflata* Sauerzopf, 1952 non Handmann, 1882**

*Melanopsis pygmaea inflata* Sauerzopf, 1952: 13, pl. 2, fig. 4 [non *Melanopsis pygmaea inflata* Handmann, 1882].

**Type locality.** No locus typicus given; occurs in Stegersbach, Litzelsdorf, Olbendorf, and Oberdorf in the Styrian Basin, Austria.

**Age.** Late Miocene (Pannonian, Serbian, biozones E–F).

**Type material.** No storage or types indicated (material derived from Sauerzopf's private collections).

**Discussion.** There are several issues with the name *Melanopsis inflata*. First, the name introduced by Sauerzopf definitely constitutes a primary homonym of *M. pygmaea inflata* Handmann, 1882. Sauerzopf (1952) explicitly introduced it as new taxon, although the combination is identical to that established by Handmann. Both taxa were obviously erected for different morphologies: while Sauerzopf's form is elongated conical, Handmann's subspecies is rather globular. Handmann's taxon is meanwhile considered as junior synonym of *M. pygmaea* Hörnes, 1856 (Wenz 1929a, p. 2813). *M. pygmaea inflata* Sauerzopf, 1952, in turn, highly resembles *M. fuchsi* Handmann, 1882 concerning its size, the regular conical outline and the slightly inflated last whorl. Exactly these last two criteria were for both authors the reason to separate their forms from *M. pygmaea* (see Handmann 1887, p. 13; Sauerzopf 1952, p. 13). Therefore we consider both synonymous and refrain from introducing a replacement name.

The second problem regards the availability of *Melanopsis inflata* Handmann, 1882. This name was already introduced as subordinate taxon by Féruccac (1823) within *M. buccinoidea*. Whether it is available as species-group name, however, cannot easily be determined, given the chaotic system in Féruccac's work (see also discussion of *M. elongata* below) and the fact that it is not found to be used as species-group name attributed to Féruccac in the literature, which would have made it available via ICZN 1999, Article 45.6.4.1. If Féruccac's name is accepted as species-group name, Handmann's taxon would become a primary homonym. Since this is apparently not the case and Handmann's subspecies was synonymized anyway, the introduction of a replacement name would be inexpedient.

### *Melanopsis elongata* auctores

In the biological and palaeontological literature several species-group taxa were introduced as "*Melanopsis elongata*". The first mention traces back to Féruccac (1823, p. 150), who described a subordinate taxon within *M. buccinoidea*, which he described two pages above, from Épernay, France. From Féruccac's remarks it is not clear, if *elongata* has subspecific or infrasubspecific rank. Moreover, the inconsistent formatting in this work leaves doubts about what is intended to be a taxon's name and what a descriptive term. Usually it is important to find out the exact rank of a taxon, since infrasubspecific taxa are not governed by the Code. In this case, however, we follow ICZN (1999, Article 45.6.4.1), stating that an infrasubspecific taxon is deemed to be subspecific from its original publication if, before 1985, it was adopted as the valid name of a species or subspecies. This criterion is at least fulfilled by the publication of Pallary (1916).

Consequently, all later introduced taxa also named "*Melanopsis elongata*" are primary homonyms of *M. elongata* Féruccac, 1923. According issues are provided by Gassies (1874, p. 384), Locard (1878, p. 58; 1893, p. 178), Doncieux (1908, p. 202), Jooss (1911, p. 72), and Gillet and Marinescu (1971, p. 55). Pallary (1916) was aware of the homonyms produced by Gassies and Doncieux and introduced the replacement names *M. goulvaini* and *M. sublongata* (erroneously written "*sublonga*" in Pallary 1926 and "*subelongata*" in Wenz 1929a). *M. elongata* Gassies, 1874 (= *M. goulvaini*) has meanwhile been synonymized with *M. frustulum* Morelet, 1857 (Bouchet 2013). Probably the problems we are presently aware of are only several of many invalidly erected taxa named "*Melanopsis elongata*".

The names introduced by Locard, Jooss and Gillet and Marinescu have not yet undergone nomenclatural revision. Although primary homonyms are invalid, it is, however, not expedient to introduce new names for taxa that are not used anymore. This particularly regards *Melanopsis narzolina elongata* Locard, 1878 from the Late Miocene of Tersanne, which was apparently not used at all by subsequent authors and synonymized by Wenz (1929a) with *M. narzolina narzolina*. If later authors regard this taxon as distinct from *M. narzolina*, a new name will have to be introduced.

A more complicated case in terms of synonymy is presented by *Melanopsis callosa elongata* Jooss, 1911 from the Aquitanian of the Mainz Basin. Wenz (1929a, p. 2729) cited the record of *M. callosa* from Jooss (1911) in the synonymy list for *M. fritzei* Thomä, 1845, both of which he considered synonymous, but either overlooked that Jooss had introduced a new variety or forgot to state it in the catalogus. The synonymization by Wenz is preliminarily accepted here, so as not to introduce yet another, probably superfluous name. A more thorough taxonomic revision is needed to clarify the taxonomic status of this subspecies and whether a new name is needed.

The remaining two homonyms are still in usage and thus require a more detailed assessment.

### *Melanopsis citharella elongata* Locard, 1893 non Féruccac, 1823

*Melanopsis citharella* var. *elongata* Locard, 1893: 178, pl. 9, fig. 17 [non *Melanopsis elongata* Féruccac, 1823].

*Melanopsis citharella elongata* Locard; Wenz 1929a: 2693 [non Féruccac 1823].

**Type locality.** Ueken, Aargau, Switzerland.

**Age.** Middle to Late Burdigalian ("Helvetician").

**Type material.** Paleontological Institute and Museum, University of Zurich, no number indicated.

**Discussion.** Unlike the case of *M. narzolina elongata* Locard, 1878, this taxon was not synonymized by Wenz (1929a, p. 2693). Despite separating it from *M. citharella*, Wenz noted that this form is probably indistinguishable from the nominal species. After review of Locard's description and illustrations we fully agree with Wenz,

and draw the taxonomic conclusion to synonymize *M. citharella elongata* with *M. citharella*. Hence, although it is a primary homonym, we avoid introducing another superfluous name.

### ***Melanopsis defensa elongata* Gillet & Marinescu, 1971 non Férußac, 1823**

*Melanopsis defensa elongata* Gillet & Marinescu 1971: 55, pl. 23, figs 38–48 [non *Melanopsis elongata* Férußac, 1823].

**Type locality.** Rădmănești, Romania.

**Age.** Late Miocene (Late Pannonian, Transdanubian sensu Sacchi and Horváth 2002; Geary et al. 2010).

**Holotype.** Gillet and Marinescu (1971) designated the specimen illustrated by Fuchs (1870a, pl. 14, fig. 79) as holotype. According to the inventory books of the Natural History Museum Vienna the material should be stored there, but despite great effort it could not be located.

**Discussion.** This case represents another primary homonym of *M. elongata* Férußac, 1823. Here some specific notes are necessary to elucidate the history of this taxon. Gillet and Marinescu (1971) erroneously linked the holotype of *M. defensa* to the variety *trochiformis* Fuchs, 1870 (Fuchs 1870a, pl. 14, figs 77–78), who explicitly separated these two specimens from the typical form (Fuchs 1870a, p. 354). Since Fuchs did not denote a holotype, all material studied by him, except the two specimens determined as *trochiformis*, are syntypes of *M. defensa defensa*. It was unwise, though nomenclaturally correct as the nominal subspecies was still based on several (not illustrated) syntypes, to assign the new name *elongata* to the remaining figure of *M. defensa* in Fuchs (1870a, pl. 14, fig. 79). If, however, a lectotype would be designated from Fuchs's original material and one would choose the figured specimen (pl. 14, fig. 79) as such, *M. defensa elongata* would become an objective synonym of *M. defensa defensa*. In conclusion, we avoid introducing a replacement name because of the obvious misapprehension of Gillet and Marinescu (1971) and synonymize *M. defensa elongata* with *M. defensa defensa*.

A part of the material of *M. defensa defensa* in Gillet and Marinescu (1971, pl. 23, fig. 10) was later separated as the new species *M. lebedai* by Lueger (1980, p. 104).

### **Order Littorinimorpha Golikov & Starobogatov, 1975**

#### **Superfamily Truncatelloidea Gray, 1840**

#### **Family Bithyniidae Gray, 1857**

### **Genus *Bitbynia* Leach in Abel, 1818**

**Type species.** *Helix tentaculata* Linnaeus, 1758. Recent, Europe. Subsequent designation by Herrmannsen (1846, p. 114).

### ***Bithynia socialis* (Papaianopol & Macaleț, 2006) non Westerlund, 1886**

*Bulimus (Tylopoma) socialis* Papaianopol & Macaleț 2006: 82, pl. 4, figs 1–5 [non *Bythinia socialis* Westerlund, 1886].

**Type locality.** Bengești, Gorj, Romania.

**Age.** Early Pliocene (Early Dacian, Getian).

**Holotype.** Collection of the Geological Institute of Romania, coll. no. 18.906.

**Discussion.** The genus-group name *Bulimus* Scopoli, 1777 was suppressed under Plenary Powers and placed on the Official Index of Rejected and Invalid Generic Names in Zoology by ICZN (1957, Op. 475). *Bithyniid* species originally attributed to this genus are now referred to *Bithynia* Leach, 1818. In a strict sense, this makes this species a primary homonym of *Bithynia socialis* Westerlund, 1886. Latter taxon has been recombined with *Paraelona* Beriozkina & Starobogatov in Anistratenko and Stadnichenko 1995, which is considered a junior synonym with *Bithynia* (Glöer and Maassen 2009; see also Kantor et al. 2010).

The status of *Bithynia socialis* (Papaianopol & Macaleț 2006), however, is doubtful. The bithyniids of the Dacian Basin are quite well studied (e.g., Cobălcescu 1883, Stefanescu 1896, Krejci-Graf and Wenz 1932, Wenz 1942, Pană et al. 1981), including material from the localities mentioned by Papaianopol and Macaleț (2006). The species closely resembles the co-occurring *Tylopoma speciosa* (Cobălcescu, 1883) and differs only in the stronger, rib-like growth lines, which were to a minor extent also detected for *T. speciosa* (Wenz 1942, p. 53). Therefore, we regard *Bithynia socialis* (Papaianopol & Macaleț 2006) as junior synonym of *T. speciosa* and do not introduce a nomen novum.

### **Family Hydrobiidae Stimpson, 1865**

#### **Subfamily Hydrobiinae Stimpson, 1865**

#### **Genus *Hydrobia* Hartmann, 1821**

**Type species.** *Cyclostoma acutum* Draparnaud, 1805. Recent, France. Type by monotypy.

#### ***Hydrobia obtusa tenuis* Wenz, 1913 non Penecke, 1886**

[*Hydrobia obtusa*] mut. *tenuis* n. mut. Wenz, 1913: 113, pl. 1, figs 12–15.

*Hydrobia obtusa tenuis* Wenz; Wenz 1926: 1922.

**Locality.** No type locality indicated; occurs in several places in Frankfurt am Main, Germany.

**Age.** Early Miocene (Aquitanian, upper *Corbicula* beds = Rüssingen Formation).

**Syntypes.** Only one of the syntypes is stored in the Senckenberg Research Institute and Natural History Museum, coll. no. SMF 245299/1 (pers. comm. R. Janssen, Frankfurt).

**Discussion.** This tricky case requires a careful assessment of the original literature. Penecke (1886, p. 35) introduced a new species, *Hydrobia tenuis*, from the Paludina beds of Malino and Sibinj in Croatia. Later, Wenz (1913) described a different new taxon as *Hydrobia obtusa tenuis* from the Frankfurt area. Despite the identical naming, Wenz' taxon is no primary homonym. Since Wenz clearly introduced this taxon as "mutation" it is not available as species-group name (ICZN 1999, Articles 45.5 and 45.6), although he erroneously cited it as "variety" when referring to his own work in the *Fossilium Catalogus* (Wenz 1926). The latter record is in fact a nomen nudum (as is true for the mutations *aperta*, *distorta*, *incrassata*, and *umbilicata*). We are not aware of any work making *Hydrobia obtusa tenuis* available by treatment as valid species or subspecies (ICZN 1999, Article 45.6.4.1).

### Subfamily *Pseudamnicolinae* Radoman, 1977

#### Genus *Pseudamnicola* Paulucci, 1878

##### *Pseudamnicola minima* (Lörenthey, 1893) non (Fuchs, 1877)

*Cyclostoma* (?) *minima* Lörenthey, 1893: 211, 306, pl. 4, fig. 1.

*Hydrobia (Pannona) minima* Lörent. sp., Lörenthey 1902: 230, pl. 16, figs 9–11.

*Amnicola (Amnicola) minima* (Lörenthey); Wenz 1926: 2068.

*Pseudamnicola (Pseudamnicola) minima* (Lörenthey); Papp 1953: 117, pl. 7, fig. 10.

**Type locality.** Șimleu Silvaniei (= Szilág-Somlyó), Sălaj, Romania.

**Age.** Late Miocene (Middle Pannonian, Serbian).

**Type material.** No storage or types indicated; probably stored in the Hungarian Geological Institute, Budapest.

**Discussion.** Both involved taxa were originally combined with different genera, but have been attributed to *Pseudamnicola* in the second half of the 20<sup>th</sup> century. Lörenthey's species was recombined with *Amnicola* by Wenz (1926), based on overall shell morphology. Because an attribution of a European species to this North American genus is relatively doubtful (Paulucci 1878, Wenz 1938–1944), Papp (1953) recombined this species with *Pseudamnicola*. *Valvata minima* Fuchs, 1877, described from the Pliocene of Megara (Fuchs 1877, p. 14, pl. 1, figs 25–27), was recombined with *Pseudamnicola* by Willmann (1981, p. 212). This would make *Pseudamnicola minima* (Lörenthey, 1893) a secondary homonym of *Pseudamnicola minima* (Fuchs, 1877). However, as pointed out by Haszprunar (2014), *Valvata minima* Fuchs, 1877 is a primary homonym of *V. minima* Hislop, 1859 from the Tertiary of East India and is thus not available (for replacement name see above). Lörenthey's species consequently is no secondary homonym and needs no replacement name. Anyway, the generic classification of neither species appears to be settled. Several species of the Miocene of Central and Southeastern Europe previously attributed to *Pseudamnicola* have been shown lately not to belong to this genus (Neubauer et al. 2013b, c).

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## References

Abel C (1818) Narrative of a journey in the interior of China, and of a voyage to and from that country, in the years 1816 and 1817; containing an account of the most interesting transactions of Lord Amherst's embassy to the court of Pekin, and observations on the countries which it visited. Illustrated by maps and other engravings. Longman, Hurst, Rees, Orme and Brown, London, xvi + 420 pp. <https://archive.org/details/narrativea-journ00abelgoog>

Adams H, Adams A (1853–1858) The genera of Recent Mollusca arranged according to their organizations. Van Voorst, London, 2 vol. of text (661 pp.), 1 vol. of plates. <http://www.biodiversitylibrary.org/bibliography/4772#/summary>

Andrusov N (1890) Kerchenskiy izvestniak i ego fauna. Zapiski Imperatorskago S.-Petersburgskago Mineralogicheskago Obshchestva, seriya 2, 26: 193–344.

Andrusov N (1897) Fossile und lebende Dreissenidae Eurasiens. Tipografiya M. Merkusheva, St. Petersburg, 683 pp.

Andrusov N (1905) Maeotische Stufe. Zapiski Imperatorskago S.-Petersburgskago Mineralogicheskago Obshchestva, seriya 2, 43: 289–451.

AnimalBase Project Group (2005–2014). AnimalBase. Early zoological literature online. Available from <http://www.animalbase.uni-goettingen.de> [accessed on 11 February 2014]

Anistratenko VV, Stadnichenko AP (1995) Fauna Ukraine. Vol. 29: Mollusca. Fasc. 1. B. 2: Orders Littoriniformes, Rissoidae. Naukova dumka, Kiev, 175 pp.

Bandel K (2010) Valvatiform Gastropoda (Heterostropha and Caenogastropoda) from the Paratethys Basin compared to living relatives, with description of several new genera and species. Freiberger Forschungshefte: Paläontologie, Stratigraphie, Fazies C 536 (18): 91–155.

Bartha F (1955) A várpalotai pliocén puhatestü fauna biosztratigrafiai vizsgálata. Magyar Földtani Intézet Évkönyve 43 (2): 275–359.

Boda J (1964) Magyarországi ősmaradványtípusok jegyzéke : őssállakatok [Catalogus originalium fossilium Hungariae : pars zoologica]. Magyar Állami Földtani Intézet, Budapest, 225 pp.

Bouchet P (2013) *Melanopsis elongata* Gassies, 1874. Accessed through: World Register of Marine Species at <http://www.marinespecies.org/aphia.php?p=taxdetails&id=730639> [accessed on 11 February 2014]

Bouchet P, Rocroi J-P, Frýda J, Hausdorf B, Ponder W, Valdés Á, Warén A (2005) Classification and Nomenclator of Gastropod Families. *Malacologia* 47 (1–2): 1–397. <http://www.biodiversitylibrary.org/page/25127194#page/11/mode/1up>

Brusina S (1874) Fossile Binnen-Mollusken aus Dalmatien, Kroatien und Slavonien nebst einem Anhange. Actienbuchdruckerei, Agram, 138 pp.

Brusina S (1884) Die Fauna der Congerienschichten von Agram in Kroatien. Beiträge zur Paläontologie und Geologie Österreich-Ungarns und des Orients 3: 125–187. <http://www.biodiversitylibrary.org/item/50749#page/139/mode/1up>

Brusina S (1892) Fauna fossile terziaria di Markusevec in Croazia. Con un elenco delle Dreisensidae della Dalmazia, Croazia e Slavonia. *Glasnik Hrvatskoga naravoslovnoga društva* 7: 113–210. <http://www.biodiversitylibrary.org/item/42638#page/131/mode/1up>

Brusina S (1893) Frammenti di Malacologia terziaria Serba. *Annales Géologiques de la Péninsule Balkanique* 4: 25–74.

Brusina S (1902) *Iconographia Molluscorum Fossilium in tellure tertiaria Hungariae, Croatae, Slavoniae, Dalmatiae, Bosniae, Herzegovinae, Serbiae and Bulgariae inventorum*. Officina Soc. Typographicae, Agram, 30 pl.

Charpentier J de (1837) Catalogue des mollusques terrestres et fluviatiles de la Suisse. Formant la seconde partie de la faune Helvétique. *Nouveaux Mémoires de la Société Helvétique des Sciences Naturelles* 1: 1–28. <http://www.biodiversitylibrary.org/item/41729#page/3/mode/1up>

Cobălcescu G (1883) Studii geologice și paleontologice asupra unor tărâmuri terțiare din unele părți ale României. *Memorile Geologice Scălei Militare din Iași* 1: 1–161.

Cox LR (1960) Thoughts on the classification of the Gastropoda. *Proceedings of the Malacological Society of London* 33: 239–261.

Criscione F, Ponder WF (2013) A phylogenetic analysis of rissooidean and cingulopsoidean families (Gastropoda: Caenogastropoda). *Molecular Phylogenetics and Evolution* 66: 1075–1082. doi: 10.1016/j.ympev.2012.11.026

Cuvier G (1795) Second Mémoire sur l'organisation et les rapports des animaux à sang blanc, dans lequel on traite de la structure des Mollusques et de leur division en ordre, lu à la société d'Histoire Naturelle de Paris, le 11 prairial an troisième. *Magasin Encyclopédique, ou Journal des Sciences, des Lettres et des Arts* 2: 433–449. <http://www.biodiversitylibrary.org/page/6736775#page/455/mode/1up>

d'Orbigny C (1837) Description de trois nouvelles espèces de Paludines fossiles. *Magasin de Zoologie* 7: Classe 5, 2 pp., pl. 79. <http://www.biodiversitylibrary.org/item/114101#page/379/mode/1up>

Dall WH (1870) On the genus *Pompholyx* and its allies, with a revision of the Limnaeidae of authors. *Annals of the Lyceum of Natural History of New York* 9: 333–361. doi: 10.1111/j.1749-6632.1870.tb00201.x, <http://www.biodiversitylibrary.org/item/22948#page/349/mode/1up>

Davitashvili LC (1931) Fossils of the Maeotian beds [in Russian]. In: Archangelsky AD, Davitashvili LC (Eds) *Characteristic fossils of the oil districts of the Crimea and Caucasus*, 6. *Transactions of the State Petroleum Research-Institute* 9: 1–37.

De Jong YSDM (Ed.) (2013) Fauna Europaea version 2.6. Web Service available online at <http://www.faunaeur.org> [accessed on 11 February 2014]

Doncieux L (1908) Catalogue descriptif des fossiles nummulitiques de l'Aude et de l'Hérault. Deuxième partie (Fascicule I). Corbières septentrionale. Annales de l'Université de Lyon, Nouvelle Série, I. Sciences, Médecine 22: 1–288.

Draparnaud JPR (1805) Histoire naturelle des Mollusques terrestres et fluviatiles de la France. Colas, Paris, 134 pp. <http://www.biodiversitylibrary.org/item/46572#page/11/mode/1up>

Duméril AMC (1806) Zoologie analytique, ou méthode naturelle de classification des animaux, rendue plus facile à l'aide de tableaux synoptiques. Allais, Paris, 344 pp. <http://www.biodiversitylibrary.org/item/44011#page/9/mode/1up>

Dybowski B, Grochmalicki J (1914) Beitrag zur Kenntnis der Baikalmollusken, I. Baicaliidae, 1. Turribaicaliinae subfam. nova. Annuaire du Musée zoologique de l'Académie impériale des sciences de St. Pétersbourg 18 (2): 268–316.

Férussac AEJPJF d'Audebard de (1812) Notice sur des Terreins d'eau douce observés en divers lieux, et sur les Fossiles terrestres et fluviatiles. Annales du Muséum National d'Histoire Naturelle 19: 242–256. <http://www.biodiversitylibrary.org/item/23270#page/276/mode/1up>

Férussac AEJPJF d'Audebard de (1814) Mémoires géologiques sur les terrains formés sous l'eau douce par les débris fossiles des mollusques vivant sur la terre ou dans l'eau non salée. Poulet, Paris, 76 pp. <http://books.google.at/books?pg=PR5&lpg=PA17&id=NqpAAAAAcAAJ&hl=de&ots=x7ErJq1S5a#v=onepage&q&f=false>

Férussac AEJPJF d'Audebard de (1821–1822) Tableaux systématiques des animaux mollusques classés en familles naturelles, dans lesquels on a établi la concordance de tous les systèmes; suivis d'un prodrome général pour tous les mollusques terrestres ou fluviatiles, vivants ou fossiles. Bertrand Sowerby, Paris, Londres, 110 pp. <http://www.biodiversitylibrary.org/item/41533#page/9/mode/1up>

Férussac AEJPJF d'Audebard de (1823) Monographie des espèces vivantes et fossiles du genre mélanoïde, *Melanopsis*, et observations géologiques à leur sujet. Mémoires de la Société d'Histoire Naturelle de Paris 1: 132–164. <http://www.biodiversitylibrary.org/item/23445#page/148/mode/1up>

Férussac JBL d'Audebard de, Férussac AEJPJF d'Audebard de (1807) Essai d'une méthode conchyliologique appliquée aux mollusques fluviatiles et terrestres d'après la considération de l'animal et de son test. Nouvelle édition augmentée d'une synonymie des espèces les plus remarquables, d'une table de concordance systématique de celles qui ont été décrites par Géoffroy, Poiret et Draparnaud, avec Müller et Linné, et terminée par un catalogue d'espèces observées en divers lieux de la France. Delance, Paris, xvi + 142 pp.

Fischer W (1996) Beiträge zur Kenntnis der rezenten und fossilen Melanopsidae VI. Über *Melanopsis coaequata* Handmann 1887 und *Melanopsis rugosa* Handmann 1887 sowie ein Nachtrag zu Teil V. (Gastropoda, Prosbranchia). Club Conchylia Informationen 28 (3/4): 19–26.

Fleming J (1818) Conchology. Encyclopedia Britannica (Supplement to eds. 4–6) 3: 284–314.

Fleming J (1822) The philosophy of zoology, a general view of the structure, functions and classification of animals, 2. Constable & Co., Edinburgh, 618 pp. <http://www.biodiversitylibrary.org/item/89678#page/7/mode/1up>

Fluck WH (1932) *Valvata simplex* Gould. The Nautilus 46 (1): 19–22. <http://www.biodiversitylibrary.org/page/8519362#page/33/mode/1up>

Froriep LF (1806) C. Dumeril's Analytische Zoologie. Aus dem Französischen mit Zusätzen. Landes-Industrie-Comptoir, Weimar, vi + 344 pp. <http://www.animalbase.uni-goettingen.de/zooweb/servlet/AnimalBase/home/digireference?id=74>

Fryda J (1998) Higher classification of the Paleozoic gastropods inferred from their early shell ontogeny. In: Bieler R, Mikkelsen PM (Eds) 13<sup>th</sup> International Malacological Congress, Abstracts. Washington D.C., 108.

Fuchs T (1870a) III. Beiträge zur Kenntniss fossiler Binnenfaunen. III. Die Fauna der Congerienschichten von Radmanest im Banate. Jahrbuch der k. k. geologischen Reichsanstalt 20 (3): 343–364. [http://opac.geologie.ac.at/wwwopacx/wwwopac.ashx?command=getcontent&server=images&value=JB0203\\_343\\_A.pdf](http://opac.geologie.ac.at/wwwopacx/wwwopac.ashx?command=getcontent&server=images&value=JB0203_343_A.pdf)

Fuchs T (1870b) VII. Beiträge zur Kenntniss fossiler Binnenfaunen. IV. und V. Die Fanna der Congerienschichten von Tihany am Plattensee und Kúp bei Pápa in Ungarn. Jahrbuch der k. k. geologischen Reichsanstalt 20 (4): 531–548. [http://opac.geologie.ac.at/wwwopacx/wwwopac.ashx?command=getcontent&server=images&value=JB0204\\_531\\_A.pdf](http://opac.geologie.ac.at/wwwopacx/wwwopac.ashx?command=getcontent&server=images&value=JB0204_531_A.pdf)

Fuchs T (1877) Studien über die jüngeren Tertiärbildungen Griechenlands. Denkschriften der Kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe 37 (2): 1–42. <http://www.biodiversitylibrary.org/item/31616#page/381/mode/1up>

Gall H (1972) Die obermiozäne Fossil-Lagerstätte Sandelhausen. 4. Die Molluskenfauna (Lamellibranchiata, Gastropoda) und ihre stratigraphische und ökologische Bedeutung. Mitteilungen der Bayerischen Staatssammlung für Paläontologie und Historische Geologie 12: 3–32.

Gassies JB (1874) Descriptions d'espèces nouvelles, terrestres et fluvio-lacustres de la Nouvelle-Calédonie. Journal de Conchyliologie 22: 375–387. <http://biodiversitylibrary.org/item/53430#page/379/mode/1up>

Geary DH (1990) Patterns of evolutionary tempo and mode in the radiation of *Melanopsis* (Gastropoda: Melanopsidae). Paleobiology 16 (4): 492–511.

Geary DH, Hoffmann E, Magyar I, Freiheit J, Padilla D (2012) Body size, longevity, and growth rate in lake Pannon melanopsid gastropods and their predecessors. Paleobiology 38 (4): 554–568. doi: 10.1666/11014.1

Geary DH, Hunt G, Magyar I, Schreiber H (2010) The paradox of gradualism: phyletic evolution in two lineages of lymnocardiid bivalves (Lake Pannon, central Europe). Paleobiology 36 (4): 592–614. doi: 10.1666/08065.1

Gillet S, Marinescu F (1971) La faune malacologique pontienne de Rădmănești (Banat Roumain). Mémoires - L'Institut de Géologie et de Géophysique 15: 1–78.

Glöer P (2002) Die Tierwelt Deutschlands, 73. Teil: Die Süßwassergastropoden Nord- und Mitteleuropas. Bestimmungsschlüssel, Lebensweise, Verbreitung. ConchBooks, Hackenheim, 327 pp.

Glöer P, Maassen WJM (2009) Three new species of the family Bithyniidae from Greece (Gastropoda: Bithyniidae). Mollusca 27 (1): 41–48.

Glöer P, Pešić V (2010) The *Planorbis* species of the Balkans with the description of *Planorbis vitojensis* n. sp. (Gastropoda: Planorbidae). Journal of Conchology 470 (3): 249–257.

Golikov AN, Starobogatov YI (1975) Systematics of prosobranch gastropods. *Malacologia* 15 (1): 185–232. <http://www.biodiversitylibrary.org/page/13122844#page/199/mode/1up>

Gorjanović-Kramberger C (1890) Die praepontischen Bildungen des Agramer Gebirges. *Glasnik Hrvatskoga naravoslovnoga društva* 5: 151–163. <http://www.biodiversitylibrary.org/item/41676#page/203/mode/1up>

Gould AA (1841) Report on the Invertebrata of Massachusetts, comprising the Mollusca, Crustacea, Annelida, and Radiata. Folsom, Wells, and Thurston, Cambridge, 6 + 373 pp. <http://archive.org/stream/reportoninverteb01goul#page/n19/mode/2up>

Gozhik PF, Datsenko LN (2007) Presnovodnyye Mollyuski pozdnego kaynozoya yuga Bostchnoy Yevropy. Chast' II. Semeystva Sphaeridae, Pisidiidae, Corbiculidae, Neritidae, Viviparidae, Valvatidae, Bithyniidae, Lithoglyphidae, Melanopsidae. Natsional'naya Akademiya Nauk Ukrainskogo Instituta Geologicheskikh Nauk, Kiev, 253 pp.

Gray JE (1840) Shells of molluscous animals. In: *Synopsis of the contents of the British Museum*. G. Woodfall, London, 105–152.

Gray JE (1847) A list of the genera of recent Mollusca, their synonyma and types. *Proceedings of the Zoological Society of London* 15: 129–242. <http://www.biodiversitylibrary.org/item/46217#page/631/mode/1up>

Gray JE (1857) Guide to the systematic distribution of Mollusca in the British Museum. Part I. Taylor & Francis, London, xii + 230 pp. <http://www.biodiversitylibrary.org/item/117528#page/5/mode/1up>

Halaváts G (1903) Die Fauna der pontischen Schichten in der Umgebung des Balatonsees. *Resultate der wissenschaftlichen Erforschung des Balatonsees* 1: 1–80.

Haller B (1892) Die Morphologie der Prosobranchier. *Morphologisches Jahrbuch* 18 (3): 451–543. <http://www.biodiversitylibrary.org/item/46983#page/485/mode/1up>

Handmann R (1882) Die fossile Molluskenfauna von Kottingbrunn. *Jahrbuch der k. k. geologischen Reichsanstalt* 32: 543–564. [http://opac.geologie.ac.at/wwwopacx/wwwopac.ashx?command=getcontent&server=images&value=JB0324\\_543\\_A.pdf](http://opac.geologie.ac.at/wwwopacx/wwwopac.ashx?command=getcontent&server=images&value=JB0324_543_A.pdf)

Handmann R (1887) Die fossile Conchylienfauna von Leobersdorf im Tertiärbecken von Wien. Aschendorff, Münster, 47 pp. <http://sammlungen.ulb.uni-muenster.de/hd/content/pageview/2023144>

Hartmann JDW (1821) System der Erd- und Flußschnecken der Schweiz. Mit vergleichender Aufzählung aller auch in den benachbarten Ländern, Deutschland, Frankreich und Italien sich vorfindenden Arten. *Neue Alpina* 1: 194–268. <http://biodiversitylibrary.org/page/41756566#page/206/mode/1up>

Hartmann JDW (1840–1844) Erd- und Süsswassergasteropoden der Schweiz. Mit Zugabe einiger merkwürdigen exotischen Arten. Scheitlin und Zollikofer, St. Gallen, xx + 227 pp. <http://www.biodiversitylibrary.org/item/100111#page/4/mode/1up>

Harzhauser M, Binder H (2004) Synopsis of the Late Miocene mollusc fauna of the classical sections Richardhof and Eichkogel in the Vienna Basin (Austria, Pannonian, MN 9–MN11). *Archiv für Molluskenkunde* 133 (1–2): 1–57.

Harzhauser M, Kowalke T, Mandic O (2002) Late Miocene (Pannonian) Gastropods of Lake Pannon with Special Emphasis on Early Ontogenetic Development. *Annalen des*

Naturhistorischen Museums in Wien 103A: 75–141. [http://verlag.nhm-wien.ac.at/pdfs/103A\\_075141\\_Harzhauser.pdf](http://verlag.nhm-wien.ac.at/pdfs/103A_075141_Harzhauser.pdf)

Harzhauser M, Tempfer PM (2004) Late Pannonian Wetland Ecology of the Vienna Basin based on Molluscs and Lower Vertebrate Assemblages (Late Miocene, MN 9, Austria). Courier Forschungsinstitut Senckenberg 246: 55–68.

Haszprunar G (2014) A nomenclator of extant and fossil taxa of the Valvatidae (Gastropoda, Ectobranchia). ZooKeys 377: 1–172. doi: 10.3897/zookeys.377.6032

Herbich F, Neumayr M (1875) Beiträge zur Kenntnis fossiler Binnenfaunen. VII. Die Süßwasserablagerungen im südöstlichen Siebenbürgen. Jahrbuch der k. k. geologischen Reichsanstalt 25: 401–431. [http://opac.geologie.ac.at/wwwopacx/wwwopac.ashx?command=getcontent&server=images&value=JB0254\\_401\\_A.pdf](http://opac.geologie.ac.at/wwwopacx/wwwopac.ashx?command=getcontent&server=images&value=JB0254_401_A.pdf)

Herrmannsen AN (1846) Indicis generum malacozoorum primordia. Nomina subgenerum, generum, familiarum, tribuum, ordinum, classum; adjectis auctoribus, temporibus, locis systematicis atque literariis, etymis, synonymis. Praetermittuntur Cirripedia, Tunicata et Rhizopoda. Vol. I. Fischer, Cassellis, i–xxvii, 1–637 pp. [http://www.biodiversitylibrary.org/item/40627#page/9\(mode/1up](http://www.biodiversitylibrary.org/item/40627#page/9(mode/1up)

Hilgendorf F (1867) Über *Planorbis multiformis* im Steinheimer Süßwasserkalk. Monatsberichte der Königlich-Preussischen Akademie der Wissenschaften zu Berlin 1866: 474–504. [http://www.biodiversitylibrary.org/item/120607#page/516\(mode/1up](http://www.biodiversitylibrary.org/item/120607#page/516(mode/1up)

Hislop S (1859) On the Tertiary deposits, associated with trap-rock, in the East Indies. The Quarterly Journal of the Geological Society of London 16: 154–182. doi: 10.1144/GSL\_JGS.1860.016.01-02.22, [http://biodiversitylibrary.org/item/109856#page/252\(mode/1up](http://biodiversitylibrary.org/item/109856#page/252(mode/1up)

Hörnes M (1851–1856) Die fossilen Mollusken des Tertiär-Beckens von Wien. I. Univalven. Abhandlungen der Geologischen Reichsanstalt 3: 185–296 pp. (1853), 385–460 pp. (1855), 461–736 pp. (1856).

ICZN (1957) Opinion 475. Validation under the Plenary Powers of the generic name *Bithynia* Leach, 1818 (Class Gastropoda) and matters associated therewith. Opinions and Declarations rendered by the International Commission on Zoological Nomenclature 16 (17): 307–330.

ICZN (1959) Opinion 573. Determination under the plenary powers of a lectotype for the nominal species *Helix vivipara* Linnaeus, 1758, and addition to the official lists of the generic name *Viviparus* Montfort, 1810, and the family-group name Viviparidae Gray, 1847 (Class Gastropoda). Bulletin of Zoological Nomenclature 17: 117–131. [http://biodiversityheritagelibrary.org/item/44459#page/139\(mode/1up](http://biodiversityheritagelibrary.org/item/44459#page/139(mode/1up)

ICZN (1999) International Code of Zoological Nomenclature. International Trust for Zoological Nomenclature, London, 306 pp. Online available from <http://www.nhm.ac.uk/hosted-sites/iczn/code/index.jsp>

Jekelius E (1944) Sarmat und Pont von Soceni (Banat). Memoriile Institutului geologic al României 5: 1–167.

Jooss CH (1911) Die Molluskenfauna der Hydrobienschichten des Hessler bei Mosbach-Biebrich. Jahrbücher des Nassauischen Vereins für Naturkunde in Wiesbaden 64: 50–74. [http://www.biodiversitylibrary.org/item/31711#page/82\(mode/1up](http://www.biodiversitylibrary.org/item/31711#page/82(mode/1up)

Jörger KM, Stöger I, Kano Y, Fukuda H, Knebelsberger T, Schrödl M (2010) On the origin of Acochlidida and other enigmatic euthyneuran gastropods, with implications for the systematics of Heterobranchia. *BMC Evolutionary Biology* 10: 323. doi: 10.1186/1471-2148-10-323

Jurišić-Polšak Z (1979) Miocenske i pliocenske neritide u Hrvatskoj. *Palaeontologia Jugoslavica* 22: 1–50.

Kabat AR, Hershler R (1993) The Prosobranch Snail Family Hydrobiidae (Gastropoda: Rissooidea): Review of Classification and Supraspecific Taxa. *Smithsonian Contributions to Zoology* 547: 1–94. doi: 10.5479/si.00810282.547

Kantor YI, Vinarski MV, Schileyko AA, Sysoev AV (2010). Catalogue of the continental mollusks of Russia and adjacent territories. Version 2.3.1. Available from [http://www.ruthenica.com/documents/Continental\\_Russian\\_molluscs\\_ver2-3-1.pdf](http://www.ruthenica.com/documents/Continental_Russian_molluscs_ver2-3-1.pdf)

Keferstein WM (1864) Brönn's Klassen und Ordnungen des Thier-Reichs wissenschaftlich dargestellt in Wort und Bild. 3. Malacozoa, 2. Kopftragende Weichthiere (Malacozoa cephalophora). Winter, Leipzig & Heidelberg, 853–1159 pp. <http://www.biodiversitylibrary.org/item/110529#page/6/mode/1up>

Kókay J (2006) Nonmarine mollusc fauna from the Lower and Middle Miocene, Bakony Mts., W Hungary. *Geologica Hungarica, Series Palaeontologica* 56: 1–196.

Krejci-Graf K, Wenz W (1932) Stratigraphie und Paläontologie des Obermiozäns und Pliozäns der Muntenia (Rumänien). *Zeitschrift der Deutschen Geologischen Gesellschaft* 83: 65–163.

Küster HC (1852–1853) Die Gattungen *Paludina*, *Hydrocaena* und *Valvata*. In Abbildungen nach der Natur mit Beschreibungen. – Systematisches Conchylien-Cabinet von Martini und Chemnitz 1 (21). Bauer & Raspe, Nürnberg, 96 pp. <http://www.biodiversitylibrary.org/item/106736#page/8/mode/1up>

Küster HC, Dunker W, Clessin S (1841–1886) Die Familie der Limnaeidae enthaltend die Genera *Planorbis*, *Limnaeus*, *Physa* und *Amphipeplea*. In Abbildungen nach der Natur mit Beschreibungen. – Systematisches Conchylien-Cabinet von Martini und Chemnitz 1 (17a). Bauer & Raspe, Nürnberg, 1–34, 35a, 36a, 35–430 pp. <http://www.biodiversitylibrary.org/item/102123#page/7/mode/1up>

Lea I (1841) Description of new freshwater and land shells. Continuation. *Proceedings of the American Philosophical Society held at Philadelphia* 2: 11–15, 30–35, 81–83, 224–225, 242–243. <http://www.biodiversitylibrary.org/item/107402#page/18/mode/1up>

Lightfoot J (1786) An account of some minute British shells, either not duly observed, or totally unnoticed by authors. *Philosophical Transactions of the Royal Society of London* 76: 160–170. doi: 10.1098/rstl.1786.0007

Linnaeus C (1758) *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis locis*. Tomus 1. Laurentius Salvius, Holmiae, iii + 824 pp. <http://www.biodiversitylibrary.org/item/10277#page/3/mode/1up>

Locard A (1878) Description de la faune de la mollasse marine et d'eau douce du Lyonnais et du Dauphiné. *Archives du Muséum d'Histoire naturelle de Lyon* 2: 1–284. <http://www.biodiversitylibrary.org/item/37394#page/11/mode/1up>

Locard A (1893) Monographie des mollusques tertiaires terrestres et fluviatiles de la Suisse. Deuxième partie. *Mémoires de la Société Paléontologique Suisse* 19: 131–275.

Lőrenthey E (1893) Adatok Szilágymegye és az erdélyi részek alsó pontusi lerakodásainak ismeretéhez [Beiträge zur Kenntnis der unterpontischen Bildungen des Szilágyer Comitates und Siebenbürgens]. Értesítő az Erdélyi Múzeum-Egyet Orvos-Természettudományi Szakosztályából II. Természettudományi Szak 18 (3): 195–230, 289–322.

Lőrenthey E (1902) Die Pannonische Fauna von Budapest. Palaeontographica 48: 137–256.  
<http://www.biodiversitylibrary.org/item/103637#page/157/mode/1up>

Lőrenthey I (1906) Beiträge zur Fauna und stratigraphischen Lage der pannonischen Schichten in der Umgebung des Balatonsees. Resultate der wissenschaftlichen Erforschung des Balatonsees, Bd. 1, Teil 1. Anhang: Palaeontologie der Umgebung des Balatonsees 4: 1–216.

Lubenescu V, Zazuleac D (1985) Les Viviparidés du Néogène supérieur du Bassin Dacique. Mémoires - L'Institut de Géologie et de Géophysique 32: 77–136.

Lueger JP (1980) Die Molluskenfauna aus dem Pannon (Obermiözän) des Fölligberges (Eisenstädter Bucht) im Burgenland (Österreich). Mitteilungen der österreichischen geologischen Gesellschaft 73: 95–134. [http://www.landesmuseum.at/pdf\\_frei\\_remote/MittGeolGes\\_73\\_0095-0134.pdf](http://www.landesmuseum.at/pdf_frei_remote/MittGeolGes_73_0095-0134.pdf)

Macaleț R (2000) New *Radix* species identified in the Neogene deposits of the Dacic Basin. Acta Palaeontologica Romaniae 2: 251–259.

Matheron PM (1842) Catalogue méthodique et descriptif des corps organisés fossiles du département des Bouches-du-Rhone et lieux circonvoisins. Extrait du Répertoire des travaux de la Société de statistique de Marseille, 6. Carnaud Fils, Marseille, 269 pp. <http://gallica.bnf.fr/ark:/12148/bpt6k5719359d/f81.image>

Melville RV, Smith JDD (Eds) (1987) Official lists and indexes of names and works in zoology. The International Trust for Zoological Nomenclature, London, 366 pp. <http://biodiversityheritagelibrary.org/item/20019#page/5/mode/1up>

Menke CT (1830) Synopsis methodica molluscorum generum omnium et specierum earum, quae in museo Menkeano adservantur; cum synonymia critica et novarum specierum diagnosibus. Editio altera, auctior et emendatior. Pyrmonti, Uslar, i–xvi, 1–168, [1] pp. <http://www.biodiversitylibrary.org/item/47244#page/5/mode/1up>

Milan A, Sakač K, Žagar-Sakač A (1974) Katalog originala tipova vrsta pohranjenih u Geološko-paleontološkom muzeju u Zagrebu. Geološko-paleontološki muzej u Zagrebu, Zagreb, 186 pp.

Milošević V (1962) Sistematski pregled primeraka-originala iz paleontološke zbirke Prirodnjackog muzeja u Beogradu. Bulletin du Museum d'Histoire Naturelle de Belgrade, Série A 16–17: 3–44.

Montfort PD de (1810) Conchyliologie systématique et classification méthodique de coquilles; offrant leurs figures, leur arrangement générique, leurs descriptions caractéristiques, leurs noms; ainsi que leur synonymie en plusieurs langues. Ouvrage destiné à faciliter l'étude des coquilles, ainsi que leur disposition dans les cabinets d'histoire naturelle. Coquilles univalves, non cloisonnées. 2. Schoell, Paris, 676 pp. <http://www.biodiversitylibrary.org/item/41566#page/9/mode/1up>

Morelet A (1857) Testacea nova Australiae. Bulletin de la Société d'Histoire Naturelle du Département de la Moselle 8: 26–33. <http://www.biodiversitylibrary.org/item/105437#page/38/mode/1up>

Müller OF (1773–1774) *Vermium terrestrium et fluviatilium historia, seu animalium Infusoriorum, Helminthicorum et Testaceorum non marinorum succincta historia*. Heineck & Faber, Havniae et Lipsiae, xxxiii + 135, xxxvi + 214 pp. <http://www.biodiversitylibrary.org/bibliography/46299#/summary>

Neubauer TA, Harzhauser M, Georgopoulou E, Mandic O, Kroh A (2014) Replacement names and nomenclatural comments for problematic species-group names in Europe's Neogene freshwater Gastropoda. *Zootaxa* 3785 (3): 453–468. doi: 10.11646/zootaxa.3785.3.7

Neubauer TA, Harzhauser M, Kroh A (2013a) Phenotypic evolution in a fossil gastropod species lineage: evidence for adaptive radiation? *Palaeogeography, Palaeoclimatology, Palaeoecology* 370: 117–126. doi: 10.1016/j.palaeo.2012.11.025

Neubauer TA, Mandic O, Harzhauser M (2011) Middle Miocene Freshwater Mollusks from Lake Sinj (Dinaride Lake System, SE Croatia; Langhian). *Archiv für Molluskenkunde* 140 (2): 201–237. doi: 10.1127/arch.moll/1869-0963/140/201-237

Neubauer TA, Mandic O, Harzhauser M (2013c) The Middle Miocene freshwater mollusk fauna of Lake Gacko (SE Bosnia and Herzegovina): taxonomic revision and paleoenvironmental analysis. *Fossil Record* 16 (1): 77–96. doi: 10.1002/mmng.201300003

Neubauer TA, Mandic O, Harzhauser M, Hrvatović H (2013b) A new Miocene lacustrine mollusc fauna of the Dinaride Lake System and its palaeobiogeographic, palaeoecologic, and taxonomic implications. *Palaeontology* 56 (1): 129–156. doi: 10.1111/j.1475-4983.2012.01171.x

Olivier GA (1804) *Voyage dans l'Empire Othoman, l'Égypte et la Perse, fait par ordre du gouvernement, pendant les six premières années de la République. Tome second*. Agasse, Paris, 466 pp.

Pallary P (1916) Observations relatives à la nomenclature des *Melanopsis* fossiles. *Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord* 7 (3): 70–87.

Pallary P (1920) Deuxième note sur la nomenclature des *Melanopsis* fossiles. *Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord* 11 (7): 104–119.

Pallary P (1925) Troisième note relative à la nomenclature des *Melanopsis* fossiles. *Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord* 16 (8): 256–258.

Pallary P (1926) Répertoire des *Melanopsis* fossiles et vivantes connus en 1925. *Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord* 17 (2–3): 73–93, 126–136.

Pană I (2003) Les nannogastropodes. In: Papaianopol I, Marinescu F, Krstić N, Macaleț R (Eds) *Chronostratigraphie und Neostratotypen. Neogen der Zentrale Paratethys*, Bd. X, Pl2. Romanien. Editura Academiei Române, București, 296–349.

Pană I, Enache C, Andreescu I (1981) Fauna de moluște a depozitelor cu ligniți din Oltenia. Institutul de cercetări, inginerie tehnologică și proiectări miniere pentru lignit, Craiova, 276 pp.

Papaianopol I (2006) Nouveaux taxons du genre *Lithoglyphus* (Gastropoda, Lithoglyphidae) des dépôts Méotiens de Roumanie (Miocène Supérieur, Bassin Dacique). *Acta Palaeontologica Romaniae* 78A: 11–20.

Papaianopol I, Macaleț R (2006) Les espèces du genre *Bulimus* (Gastropoda, Mesogastropoda) du Néogène Supérieur (l'interval Pontien-Romanien) du Bassin Dacique. *Acta Palaeontologica Romaniae* 78A: 77–110.

Papaianopol I, Marinescu F (1995) Faune de mollusques daciens du Bassin Dacique. In: Marinescu F, Papaianopol I (Eds) Chronostratigraphie und Neostratotypen. Neogen der Zentrale Paratethys, Bd. IX, Pl1. Dacien. Editura Academiei Române, Bucureşti, 130–267.

Papp A (1951) Das Pannon des Wiener Beckens. Mitteilungen der Geologischen Gesellschaft in Wien 39–41: 99–193. [http://www.biologiezentrum.at/pdf\\_frei\\_remote/MittGeolGes\\_39\\_41\\_0099-0193.pdf](http://www.biologiezentrum.at/pdf_frei_remote/MittGeolGes_39_41_0099-0193.pdf)

Papp A (1953) Die Molluskenfauna des Pannon des Wiener Beckens. Mitteilungen der geologischen Gesellschaft in Wien 44: 85–222. [http://www.biologiezentrum.at/pdf\\_frei\\_remote/MittGeolGes\\_44\\_0085-0222.pdf](http://www.biologiezentrum.at/pdf_frei_remote/MittGeolGes_44_0085-0222.pdf)

Papp A, Steininger F (1979) The Pliocene of the Megara-Graben. Examples of marine/brackish limnic cycles triggering the evolution of endemic mollusc faunas. In: Symeonidis N, Panikolaou D, Dermitzakis M (eds) Field Guide to the Neogene of Megara – Pelopponisos – Zakynthos. Publications of the Department of Geology & Paleontology, University of Athens, series A 34: 1–16.

Paulucci M (1878) Matériaux pour servir à l'étude de la faune malacologique terrestre et fluviatile de l'Italie et de ses îles. Savy, Paris, 54 pp. <http://www.biodiversitylibrary.org/item/47695#page/9/mode/1up>

Pavlović PS (1903) Grada za poznavanje tercijara u Staroj Srbiji. Annales Géologiques de la Péninsule Balkanique 6 (1): 155–189.

Pavlović PS (1927) Donjopontiski mukuši iz okoline Beograda (s naročitim obzirom na fosilnu faunu okoline sela Vrčina). Sprska Akademija nauka, posebna izdanja 66 (Prirodnjački i matematički spisi 17): 1–121.

Pavlović PS (1932) Novi prilošci za poznavanje fosilne faune iz Kosovske i Metohiskopodrimske Kotline. Bulletin du Service Géologique du Royaume de Yougoslavie 1 (2): 231–253.

Penecke KA (1886) Beiträge zur Kenntniss der Fauna der slavonischen Paludinenschichten. Beiträge zur Paläontologie Österreich-Ungarns und des Orients 4: 15–44. <http://www.biodiversitylibrary.org/item/50742#page/27/mode/1up>

Pfeiffer C (1828) Naturgeschichte deutscher Land- und Süßwasser-Mollusken. Dritte Abtheilung. Landes-Industrie-Comptoir, Weimar, vi + 84 pp. [http://gdz.sub.uni-goettingen.de/dms/load/img/?PPN=PPN620452897&DMDID=&LOGID=LOG\\_0005&PHYSID=PHYS\\_0006](http://gdz.sub.uni-goettingen.de/dms/load/img/?PPN=PPN620452897&DMDID=&LOGID=LOG_0005&PHYSID=PHYS_0006)

Poey F (1852) Introducción a los Ciclostomas con generalidades sobre los moluscos gasterópodos y particularmente sobre los terrestres operculados. Memorias sobre la Historia Natural de Cuba 1 (8): 77–96. <http://www.biodiversitylibrary.org/item/20113#page/83/mode/1up>

Popović R (1969) O prisustvu ekvivalenta dakiskog kata u Metohijskom basenu. Vesnik Zavoda za Geološka i Geofizicka Istrazivanja N.R. Srbije, Serija A 27: 105–120.

Popović R (1970) Nouveaux représentants du genre de gastéropodes *Viviparus* des sédiments levantins du bassin de Metohja. Bulletin scientifique, Section A 15 (9–10): 317–319.

Radoman P (1977) Hydrobiidae auf der Balkanhalbinsel und in Kleinasien. Archiv für Molluskenkunde 107 (4/6): 203–223.

Rafinesque CS (1815) Analyse de la nature ou tableau de l'univers et des corps organisés. Privately published by author, Palerme, 223 pp. <http://gallica.bnf.fr/ark:/12148/bpt6k98061z>

Rasser MW (2013) Evolution in isolation: the *Gyraulus* species flock from Miocene Lake Steinheim revisited. *Hydrobiologia*. doi: 10.1007/s10750-013-1677-4

Rzehak A (1888) Neue Conchylien aus dem mährischen Pleistocän. *Verhandlungen der k. k. geologischen Reichsanstalt* 1888 (16): 307–308. <http://www.biodiversitylibrary.org/item/120929#page/715/mode/1up>

Sacchi M, Horváth F (2002) Towards a new time scale for the Upper Miocene continental series of the Pannonian basin (Central Paratethys). *EGU Stephan Mueller Special Publication Series* 3: 79–94. <http://www.stephan-mueller-spec-publ-ser.net/3/79/2002/smss-3-79-2002.pdf>

Sandberger CLF (1870–1875) Die Land- und Süßwasser-Conchylien der Vorwelt. C. W. Kreidel, Wiesbaden, livr. 1–3: 1–96 pp. (1870); livr. 4–5: 97–160 pp. (1871); livr. 6–8: 161–256 pp. (1872); livr. 9–10: 257–352 pp. (1873); livr. 11: 353–1000 pp. (1875).

Sandberger F (1880) Ein Beitrag zur Kenntniss der unterpleistocänen Schichten Englands. *Palaeontographica* 27 (2): 83–104. <http://www.biodiversitylibrary.org/item/103954#page/97/mode/1up>

Sauerzopf F (1952) Beitrag zur Entwicklungsgeschichte des südburgenländischen Pannons. *Burgenländische Heimatblätter* 14 (1): 1–16.

Sauerzopf F (1953) Die Planorbidae aus dem Panon des Alpenostrandes. *Burgenländische Heimatblätter* 15 (2): 49–66.

Schlickum WR (1978) Zur oberpannonen Molluskenfauna von Öcs, I. *Archiv für Molluskenkunde* 108 (4–6): 245–261.

Scopoli JA (1777) *Introductio ad historiam natvralem sistens genera lapidvm, plantarvm, et animalivm hactenus detecta, caracteribvs essentialibvs donata, in tribvs divisa, svbinde ad leges natvrae*. Gerle, Pragae, [1–9], 3–506, [1–34] pp.

Soós L (1934) Az Öcsi felső-pontusi Mollusca-fauna. *Állattani Közlemények* 31 (3–4): 183–210.

Sowerby GB (1821–1834) *The genera of recent and fossil shells, for the use of students in conchology and geology*, 2 volumes. privately published, London, 950 pp.

Stefanescu S (1896) Études sur les Terrains tertiaires de Roumanie. Contribution à l'étude des faunes sarmatique, pontique et levantine. *Mémoirs de la Société Géologique de France*, Mémoir 15. *Paléontologique* 6 (2–3): 1–147.

Stevanović PM (1951) Pontische Stufe im engeren Sinne - obere Congerienschichten Serbiens und der angrenzenden Gebiete. *Sprska Akademija nauka, posebna izdanja* 187 (Geološki institut 2): 1–361.

Stevanović PM (1978) Neue Pannon-Pontische Molluskenarten aus Serbien. *Annales Géologiques de la Péninsule Balkanique* 42: 315–344.

Stevanović P (1990) Die pontische halbbrackische Molluskenfauna aus Serbien und Bosnien. In: Stevanović P, Nevesskaya LA, Marinescu F, Sokač A, Jámbor Á (Eds) *Chronostratigraphie und Neostratotypen. Neogen der Westlichen ("Zentrale") Paratethys*, Bd. VIII, Pl1. Pontien. Verlag der Jugoslawischen Akademie der Wissenschaften und Künste und der Serbischen Akademie der Wissenschaften und Künste, Zagreb, Beograd, 462–537.

Stimpson W (1865) Researches upon the Hydrobiinae and allied forms: chiefly made from materials in the Museum of the Smithsonian Institution. *Smithsonian Miscellaneous Collections* 7: 1–59. <http://www.biodiversitylibrary.org/item/35640#page/431/mode/1up>

Strausz L (1942) Das Pannon des mittleren Westungarns. *Annales historico-naturales musei nationalis Hungarici, pars mineralogica, geologica et palaeontologica* 35: 1–102.

Strong EE, Gargominy O, Ponder WF, Bouchet P (2008) Global diversity of gastropods (Gastropoda; Mollusca) in freshwater. *Hydrobiologia* 595: 149–166. doi: 10.1007/s10750-007-9012-6

Sztanó O, Magyar I, Szónoky M, Lantos M, Müller P, Lenkey L, Katona L, Csillag G (2013) A Tihanyi Formáció a Balaton környékén: típuszselvény, képződési körülmények, rétegtani jellemzés. *Földtani Közlöny* 143 (1): 73–98.

Thomä C (1845) Fossile Conchylien aus den Tertiärschichten bei Hochheim und Wiesbaden gesammelt und im naturhistorischen Museum zu Wiesbaden ausgestellt. *Jahrbücher des Vereins für Naturkunde in Nassau* 2: 125–162.

Tournouër R (1876) Étude sur les fossiles tertiaires recueillis par M. Gorceix dans l'île de Cos, en 1873. *Annales scientifiques de l'École normale supérieure* 5: 445–475.

Tryon GW (1866) [Book review of] *Researches upon the Hydrobiinae and allied forms by Dr. Wm. Stimpson*, 8 vol. Smithsonian Institution, Washington DC, August 1865, 58 p. *American Journal of Conchology* 2 (2): 152–158.

von Zieten C-H (1830–1832) *Die Versteinerungen Württembergs*. Verlag & Lithographie der Expedition des Werkes unserer Zeit, Stuttgart, 102 pp. <http://www.e-rara.ch/zut/content/pageview/4206543>

Wagner AJ (1928) Studien zur Molluskenfauna der Balkanhalbinsel mit besonderer Berücksichtigung Bulgariens und Thraziens, nebst monographischer Bearbeitung einzelner Gruppen. *Annales Zoologici Musei Polonici Historiae Naturalis* 6 (4): 263–399.

Welter-Schultes FW (2012) European non-marine molluscs, a guide for species identification. Planet Poster Editions, Göttingen, 679 pp.

Wenz W (1913) Die Arten der Gattung *Hydrobia* im Mainzer Becken. *Nachrichtsblatt der Deutschen Malakozoologischen Gesellschaft* 1913 (2–3): 76–86, 113–123.

Wenz W (1919a) Zur Nomenklatur tertiärer Land- und Süßwassergastropoden. I. *Nachrichtsblatt der Deutschen Malakozoologischen Gesellschaft* 51 (2): 68–76. <http://www.biodiversitylibrary.org/item/110094#page/82/mode/1up>

Wenz W (1919b) Zur Nomenklatur tertiärer Land- und Süßwassergastropoden. II. *Senckenbergiana* 1: 63–67. <http://www.biodiversitylibrary.org/item/95236#page/75/mode/1up>

Wenz W (1919c) Zur Nomenklatur tertiärer Land- und Süßwassergastropoden. III. *Senckenbergiana* 1: 238–240. <http://www.biodiversitylibrary.org/item/95236#page/246/mode/1up>

Wenz W (1922) Zur Nomenklatur tertiärer Land- und Süßwassergastropoden. IV. *Senckenbergiana* 4: 5–7. <http://www.biodiversitylibrary.org/item/95135#page/231/mode/1up>

Wenz W (1923a) Zur Nomenklatur tertiärer Land- und Süßwassergastropoden. V. *Senckenbergiana* 5: 114–116.

Wenz W (1923–1930) *Fossilium Catalogus I: Animalia. Gastropoda extramarina tertiaria*. W. Junk, Berlin, I: IV: 1069–1420 pp. (1923b), V: 1421–1734 pp. (1923c), VII: 1863–2230 pp. (1926), VIII: 2231–2502 pp. (1928a), IX: 2503–2886 pp. (1929a). <http://www.biodiversitylibrary.org/bibliography/61839#/summary> [volumes I–VI]

Wenz W (1924) Zur Nomenklatur tertiärer Land- und Süßwassergastropoden. VI. *Senckenbergiana* 6: 221–223.

Wenz W (1925) Zur Nomenklatur tertiärer Land- und Süßwassergastropoden. VII. Senckenbergiana 7: 124–125.

Wenz W (1928b) Zur Nomenklatur tertiärer Land- und Süßwassergastropoden. VIII. Senckenbergiana 10: 119–120.

Wenz W (1928c) Zur Nomenklatur tertiärer Land- und Süßwassergastropoden. IX. Senckenbergiana 10: 219–220.

Wenz W (1929b) Zur Nomenklatur tertiärer Land- und Süßwassergastropoden. X. Senckenbergiana 11: 117.

Wenz W (1930) Zur Nomenklatur tertiärer Land- und Süßwassergastropoden. XI. Senckenbergiana 12: 64–66.

Wenz W (1938–1944) *Gastropoda*. Teil 1: Allgemeiner Teil und Prosobranchia. In: Schindewolf OH (Ed.) *Handbuch der Paläozoologie*, Band 6. Verlag Gebrüder Bornträger, Berlin, 1–1639.

Wenz W (1942) Die Mollusken des Pliozäns der rumänischen Erdöl-Gebiete als Leitversteinerungen für die Aufschluß-Arbeiten. Senckenbergiana 24: 1–293.

Wenz W, Edlauer A (1942) Die Molluskenfauna der oberpontischen Süßwassermergel vom Eichkogel bei Mödling, Wien. Archiv für Molluskenkunde 74 (2/3): 82–98.

Westerlund CA (1886) Fauna der in der paläarctischen Region (Europa, Kaukasien, Sibirien, Turan, Persien, Kurdistan, Armenien, Mesopotamien, Kleinasien, Syrien, Arabien, Egypten, Tripolis, Tunesien, Algerien und Marocco) lebenden Binnenconchylien. VI. Fam. Ampullariidae, Paludinidae, Hydrobiidae, Melapiidae, Valvatidae & Neritidae. Håkan Ohlsson, Lund, 156+13 pp. <http://www.biodiversitylibrary.org/item/41051#page/161/mode/1up>

Wilke T, Albrecht C, Anistratenko VV, Sahin SK, Yildirim MZ (2007) Testing biogeographical hypotheses in space and time: faunal relationships of the putative ancient Lake Egirdir in Asia Minor. *Journal of Biogeography* 34: 1807–1821. doi: 10.1111/j.1365-2699.2007.01727.x

Willmann R (1977) Biostratigraphie mit limnischen Mollusken am Beispiel des Neogens von Kos (Griechenland). *Meyniana* 29: 71–79.

Willmann R (1981) Evolution, Systematik und stratigraphische Bedeutung der neogenen Süßwassergastropoden von Rhodos und Kos/Ägäis. *Palaeontographica Abt. A* 174: 10–235.